UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/563,893	05/22/2006	Per Stobbe	HER07 P-113	7210

28101 7590 10/05/2009

VAN DYKE, GARDNER, LINN & BURKHART, LLP
SUITE 207
2851 CHARLEVOIX DRIVE, S.E.
GRAND RAPIDS, MI 49546

EXAMINER	
GREENE, JASON M	
ART UNIT	**PAPER NUMBER**
1797	

MAIL DATE	DELIVERY MODE
10/05/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/563,893	STOBBE ET AL.	
	Examiner	Art Unit	
	Jason M. Greene	1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 January 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

Response to Arguments

1. Applicant's arguments, see page 9, line 13 to page 13, line 24, filed 18 June 2009, with respect to the rejection(s) of claim(s) 1-28 under 35 USC 103 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of the Kriegesmann et al. publication.

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1-13 and 22-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Great Britain Patent GB 790,762 in view of International Patent Application Publication WO 00/01463, Zeller et al. (US 7,112,237B2), Blaney (US 5,679,248) and Kriegesmann et al. "Characterizing the Consolidation of Bimodally

Distributed Fine-Grained Silicon Carbide Powders" (hereinafter the Kriegesmann et al. publication).

GB 790,762 discloses a method for the production of filter membrane (see page 1, lines 42-44) comprising selection of a first ceramic (SiC) powder with a first grain class size, selection a second ceramic (SiC) powder with a second grain size class that is substantially smaller than the first grain size class, mixing the first and second ceramic powders to produce a powder with a bimodal grain size distribution, shaping of a molded body from the powder mixture, and heating and conditioning of the molded body at a temperature and for a period of time such that, through a recrystallization of the molded body, the grains with the second grain size are dissolved, and through attachment of the material of the second grains to the first ceramic grains, these are firmly linked to each other, wherein the grains of the first and second powders have a chosen maximum and minimum grain size, wherein the first and second ceramic powders are present in a slurry and the shaping of the molded body is effected by casting on a substrate (the plaster of Paris mold), and including drying of the molded body prior to the heating and conditioning, wherein the first and second powders have narrow grain size distributions, wherein the heating and conditioning comprises selecting the temperature and firing duration such that generally all grains of the second ceramic powder are no longer present in the microstructure of the finished ceramic body and such that the grain size of the first ceramic powder remains substantially unchanged, and wherein the mixing ratio of the first and second ceramic powders is 6:4 (see Ex. 2) in page 1, line 17 to page 4, line 48.

GB 790,762 does not teach the first and second powders comprising α-SiC or several layers being formed.

WO 00/01463 teaches a similar method wherein α-SiC ceramic powders are used since they do not react with precious metal coatings (catalysts), are more readily available commercially, and are preferred since the final product is α-SiC in page 8, line 17 to page 9, line 26 and Ex. 1 on pages 16-17.

Blaney teaches forming a filter comprising several layers of differing pore structure to improve efficiency and decrease pressure drop in Fig. 3 and col. 6, line 65 to col. 7, line 19. Zeller et al. discloses a multilayer sintered filter structure wherein a second layer is cast on a first, coarser, layer in Figs. 1-3.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the multilayer structure suggested by Blaney and Zeller et al. into the method of GB 790,672 to provide a more efficient filter structure, as suggested by Blaney and Zeller et al.

GB 790,762, WO/01463, Zeller et al. and Blaney do not teach recrystallizing the SiC at a temperature between 1750 and 1950 ^{0}C, but the Kriegesmann et al. publication teaches a similar porous SiC body wherein the SiC is recrystallized at 1840 to 1880 ^{0}C to minimize grain growth of the coarse grain in Fig. 2 and sections 1, 4.1 and 4.2.

With regard to claims 6, 11, 13 and 24, while the GB 790,762 reference does not teach the recited grain sizes, one of ordinary skill in the art at the time the invention was made would have recognized that the grain sizes could be selected as a matter of design choice to optimize the filtering performance in a given application. It is especially

noted that WO 00/01463 teaches that grain sizes from fraction of a μm to several mm may be used.

4. Claims 14-21 and 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Great Britain Patent GB 790,762 in view of International Patent Application Publication WO 00/01463, Zeller et al. (US 7,112,237B2), Blaney (US 5,679,248) and Kriegesmann et al. "Characterizing the Consolidation of Bimodally Distributed Fine-Grained Silicon Carbide Powders" (hereinafter the Kriegesmann et al. publication).

GB 790,762 discloses the claimed filter except for the first and second powders comprising α-SiC and the filter comprising several layers.

WO 00/01463 teaches a similar filter wherein α-SiC ceramic powders are used since they do not react with precious metal coatings (catalysts), are more readily available commercially, and are preferred since the final product is α-SiC in page 8, line 17 to page 9, line 26 and Ex. 1 on pages 16-17.

Blaney teaches forming a filter comprising several layers of differing pore structure to improve efficiency and decrease pressure drop in Fig. 3 and col. 6, line 65 to col. 7, line 19. Zeller et al. discloses a multilayer sintered filter structure wherein a second layer is cast on a first, coarser, layer in Figs. 1-3.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the multilayer structure suggested by Blaney and

Zeller et al. into the filter of GB 790,672 to provide a more efficient filter structure, as suggested by Blaney and Zeller et al.

GB 790,762, WO/01463, Zeller et al. and Blaney do not teach recrystallizing the SiC at a temperature between 1750 and 1950 ^{0}C, but the Kriegesmann et al. publication teaches a similar porous SiC body wherein the SiC is recrystallized at 1840 to 1880 ^{0}C to minimize grain growth of the coarse grain in Fig. 2 and sections 1, 4.1 and 4.2.

With regard to claims 20 and 28, while the GB 790,762 reference does not teach the filter exhibiting the recited flow, it would inherently exhibit the recited flow since it has the same structure as the claimed filter.

5. Claims 1-13 and 22-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Way et al. (US 6,214,078 B1) in view of International Patent Application Publication WO 00/01463, Zeller et al. (US 7,112,237B2), Blaney (US 5,679,248) and Kriegesmann et al. “Characterizing the Consolidation of Bimodally Distributed Fine-Grained Silicon Carbide Powders” (hereinafter the Kriegesmann et al. publication).

Way et al. discloses a method for the production of filter membrane comprising selection of a first ceramic (SiC) powder with a first grain class size, selection a second ceramic (SiC) powder with a second grain size class that is substantially smaller than the first grain size class, mixing the first and second ceramic powders to produce a powder with a bimodal grain size distribution, shaping of a molded body from the powder mixture, and heating and conditioning of the molded body at a temperature and

for a period of time such that, through a recrystallization of the molded body, the grains with the second grain size are dissolved, and through attachment of the material of the second grains to the first ceramic grains, these are firmly linked to each other, wherein the grains of the first and second powders have a chosen maximum and minimum grain size, wherein the first and second ceramic powders are present in a slurry and the shaping of the molded body is effected by casting on a substrate (the mold), and including drying of the molded body prior to the heating and conditioning, wherein the first and second powders have narrow grain size distributions, wherein the heating and conditioning comprises selecting the temperature and firing duration such that generally all grains of the second ceramic powder are no longer present in the microstructure of the finished ceramic body and such that the grain size of the first ceramic powder remains substantially unchanged, and wherein the mixing ratio of the first and second ceramic powders is 1:1 to 2:1 (the intermediate grit to the fine grit powders, see col. 3, lines 18-24) in page 1, line 17 to page 4, line 48.

GB 790,762 does not teach the first and second powders comprising α-SiC or several layers being formed.

WO 00/01463 teaches a similar method wherein α-SiC ceramic powders are used since they do not react with precious metal coatings (catalysts), are more readily available commercially, and are preferred since the final product is α-SiC in page 8, line 17 to page 9, line 26 and Ex. 1 on pages 16-17.

Blaney teaches forming a filter comprising several layers of differing pore structure to improve efficiency and decrease pressure drop in Fig. 3 and col. 6, line 65

to col. 7, line 19. Zeller et al. discloses a multilayer sintered filter structure wherein a second layer is cast on a first, coarser, layer in Figs. 1-3.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the multilayer structure suggested by Blaney and Zeller et al. into the method of Way et al. to provide a more efficient filter structure, as suggested by Blaney and Zeller et al.

Way et al., WO/01463, Zeller et al. and Blaney do not teach recrystallizing the SiC at a temperature between 1750 and 1950 ^{0}C, but the Kriegesmann et al. publication teaches a similar porous SiC body wherein the SiC is recrystallized at 1840 to 1880 ^{0}C to minimize grain growth of the coarse grain in Fig. 2 and sections 1, 4.1 and 4.2.

With regard to claims 6, 11, 13 and 24, while the Way et al. reference does not teach the recited grain sizes, one of ordinary skill in the art at the time the invention was made would have recognized that the grain sizes could be selected as a matter of design choice to optimize the filtering performance in a given application. It is especially noted that WO 00/01463 teaches that grain sizes from fraction of a μm to several mm may be used.

6. Claims 14-21 and 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Way et al. (US 6,214,078 B1) in view of International Patent Application Publication WO 00/01463, Zeller et al. (US 7,112,237B2), Blaney (US 5,679,248) and Kriegesmann et al. “Characterizing the Consolidation of Bimodally

Distributed Fine-Grained Silicon Carbide Powders" (hereinafter the Kriegesmann et al. publication).

Way et al. discloses the claimed filter except for the first and second powders comprising α-SiC and the filter comprising several layers.

WO 00/01463 teaches a similar filter wherein α-SiC ceramic powders are used since they do not react with precious metal coatings (catalysts), are more readily available commercially, and are preferred since the final product is α-SiC in page 8, line 17 to page 9, line 26 and Ex. 1 on pages 16-17.

Blaney teaches forming a filter comprising several layers of differing pore structure to improve efficiency and decrease pressure drop in Fig. 3 and col. 6, line 65 to col. 7, line 19. Zeller et al. discloses a multilayer sintered filter structure wherein a second layer is cast on a first, coarser, layer in Figs. 1-3.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the multilayer structure suggested by Blaney and Zeller et al. into the filter of Way et al. to provide a more efficient filter structure, as suggested by Blaney and Zeller et al.

Way et al., WO/01463, Zeller et al. and Blaney do not teach recrystallizing the SiC at a temperature between 1750 and 1950 ^{0}C, but the Kriegesmann et al. publication teaches a similar porous SiC body wherein the SiC is recrystallized at 1840 to 1880 ^{0}C to minimize grain growth of the coarse grain in Fig. 2 and sections 1, 4.1 and 4.2.

With regard to claims 20 and 28, while the Way et al. reference does not teach the filter exhibiting the recited flow, it would inherently exhibit the recited flow since it has the same structure as the claimed filter.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason M. Greene whose telephone number is (571)

272-1157. The examiner can normally be reached on Monday - Friday (10:00 AM to 6:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Marcheschi can be reached on (571) 272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jason M. Greene
Primary Examiner
Art Unit 1797

/Jason M. Greene/
9/28/09

jmg
September 28, 2009